Space Weather Forecast

Issued on Sunday, 23 April 2023 at 13:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Strong geomagnetic storm forecast Day 2 (Monday 24 April). Slight chance of Moderate-class flares (R1-R2; Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with a few minor Common-class flares observed. There are currently six sunspot regions on the visible disc. Five are numbered and AR3282 approaching the northwest limb is the largest grouping and has lost a few more intermediate spots in recent hours. AR3285 in the southeast is second largest with little change. The remaining sunspot regions remain small and stable, including a new and currently unnumbered sunspot region in the far southeast. A large Coronal Mass Ejection (CME) from the sun is due to arrive at Earth either late on day 1 (23 Apr) or during the UTC morning of day 2 (24 Apr). No further Earth-directed CMEs have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind has declined from slightly elevated to Slow levels. The associated magnetic field was stable and at weak levels until around 23/0800UTC when levels became moderate. The all-important north-south component of the field was also mostly at weak levels until late in the period when moderate levels were reached. The net effect of the above solar wind measures was for Quiet to Unsettled (Kp1-3) geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed through the period, although energetic particles were at higher than usual levels but remained below the minor storm (S1) threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is most likely to continue at Low levels of activity with a slight chance of Moderate activity, mainly due to the largest sunspot group but perhaps also from the second largest region in the southeast.

Solar Wind / Geomagnetic Activity: Solar winds are currently at Slow levels and may become slight elevated in the coming hours. The large full-halo CME (Coronal Mass Ejection) that left the sun on Friday evening (21/1812 UTC is due to arrive at Earth either late on Day 1 (23 Apr) or in the early hours of Day 2 (24 Apr). The onset of a Minor Geomagnetic Storm is considered Likely during Day 2 (Monday 24 April), with a chance of a Moderate to Strong storm. Activity then waning through Day 3 (25 April).

Energetic Particles / Solar Radiation: No solar radiation storms have been observed however the slight increase in activity gives a slight chance of minor storm (S1) levels being reached. This is most likely to be due to the largest sunspot region if a significant eruption were to occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	80	40	10
Strong	G3	No	20	50	20	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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